



Just these tones, but four octaves lower!

"At once it will be incredulously replied, 'No human ear ever has heard, or ever can hear, tones at such a depth.' I arrived at my conclusions both theoretically and practically, and the two results coincided exactly." For the explanation of this, those interested will do well to consult the article itself. It may be noted here, however, that notes 3 and 4 were heard *everywhere*; that the 5th and 6th were perfectly distinct, but of far less power; that the 7th (the interval of the tenth) was of a power and clearness entirely out of proportion to the harmonics as usually heard in the organ, &c.; and that the 8th, 9th, and 10th notes were only heard occasionally and with a transient impression. Mr. Schuyler then points out that, allowing for the fact that the diameter of Niagara is the greatest possible compared with its height, the length of an organ-pipe necessary to give the key-note of Niagara (four octaves below note 1 in the diagram) would be just the average height of the Falls! The figures given are 170·66 feet - 10·24 feet = 160·42 feet, where the 10·24 feet is the allowance for the extra diameter of Niagara treated as an organ-pipe.

It appears, then, that the tone of Niagara is, *note for note*, the dominant chord of our natural scale in music. Its rhythm is one note per second, with three notes in each measure, the first note being the accented one, and the single beats are represented by groups of three semi-quavers, where M.M. 60 = $\frac{1}{3}$ or three times three, three times repeated.

Mr. Schuyler thus concludes in words with which I heartily sympathise. "I have spoken only of the pitch and rhythm of Niagara. What is the *quality* of its tone? Divine! There is no other word for a tone made and fashioned by the Infinite God. I repeat, there is no roar at all—it is the sublimest music on earth!"

WILLIAM LANT CARPENTER

ZOOLOGICAL RESULTS OF THE VISIT OF PROF. K. MOEBIUS TO MAURITIUS.

THIS work, which is illustrated by a map and twenty-two plates, contains the results of the investigations of Prof. Möbius on the marine fauna of Mauritius and the Seychelle Islands, embodying the account of observations made by him on the spot, and of work done on the collections which he brought home with him on his return from his visit to the islands. It commences with an account of the journey to Mauritius in 1874-75; an account of the Suez Canal is given, and of the voyage through the Red Sea, where *Trichodesmium*, the yellowish-red floating algae supposed by some to have given the name to the sea, was met with in abundance. After the well-known tanks of Aden and the Somali divers who surround every ship that comes into the port have been described, Réunion is touched at, and at last Mauritius.

A concise account is given of the geographical, geological, and climatic peculiarities of this island, which is about one-third the size of Holstein. The centre of the island is occupied by a plateau elevated over 1700 feet above sea-level, the highest point being 2711 feet in height. The plateau is surrounded on nearly all sides by mountains, and from these on all sides but the northern,

¹ Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen, bearbeitet von K. Möbius, F. Richter und E. von Martens, u.s.w. (Berlin: Otto Enslin. 1880.)

where there is a gradual inclination, rivers and streams fall down very steep slopes with frequent waterfalls into the sea. Rains are very heavy, and the mountain torrents swell with remarkable rapidity. The geological structure of the island is entirely volcanic, with the exception of beds of coral rock. The mean temperature of the year is about 25°85 C. Rain is most abundant from December to May. The prevailing wind is the south-east trade. Cyclones are sometimes experienced in the period, December to April, but do not occur every year.

Mauritius had originally no mammalian inhabitants excepting bats. The great fruit-bat (*Pteropus vulgaris*) is abundant in the woods. These fruit-bats are easily tamed. One of them was a great pet of Mr. G. Clark, now dead, who was the author of "A Brief Notice of the Fauna of the Mauritius," published in the *Mauritius Almanac* for 1859, and containing some very good observations. This tame bat was taken when young from its mother's breast and brought up by hand. It could not fly, because its wing membranes had been cut through to prevent its doing so. It usually passed its time hanging on to the back of a chair. Directly Mr. Clark came into the room it cried out loudly to be nursed. If it were not taken up at once it climbed up to him, rubbed its head against him, and licked his hands. If Mr. Clark sat down the bat hung on at once to the back of the chair, and followed all the movements of its master with its bright eyes. If its master caught hold of a fruit it climbed forthwith down his arm to his hand to get its share, and it always got two teaspoonsful out of every cup of tea or coffee. If Mr. Clark took any kind of object in his hand the bat climbed to it, examined it with its eyes and nose, and only returned to its chair-back after completely satisfying its curiosity. It followed its master even into the open air if the door was not shut to prevent its getting out.

A good many mammals have been introduced into the island, and are now abundant. A monkey from the East Indies (*Macacus cynomolgus*) inhabits the woods, and makes excursions from thence to plunder the sugar-cane fields. One of the species of the curious hedgehog-like insectivora of Madagascar (*Centetes ecaudatus*) was introduced in the island at the end of the last century. The animals live in damp places and lie in a state of sleep (= hibernation) in the dry season, sleeping then so soundly that they do not awake even when dug up. As soon as the rainy season begins in November they wake up and breed, producing three litters of fifteen or sixteen young every year. The young follow the mother, who calls them with a grunting noise, in a row behind, and protects them when molested with her teeth and spines. A full-grown male weighs as much as four pounds. The animals are so abundant that on a moonlight night with trained dogs twenty or thirty may be caught by one hunter. They are eaten by the working classes.

Besides these there is a shrew mouse, also introduced from the East Indies, a small hare, and the ubiquitous common rat, both of which latter gnaw and destroy the sugar-cane. A stag (*Cervus hippelaphas*) introduced by the Portuguese inhabits the woods. It breeds in July and August, and casts its horns in December or January.

We cannot follow the author in his short reference to the birds and account of the fish. The coral-reefs of the island appear to abound with animal life of all kinds. Several of the corals composing them are laid dry constantly at low tide, and remain exposed to the air without injury. *Goniastrea retiformis* and *Leptoria gracilis* are cited as examples of such. Whilst these corals are in this condition, the polyps remain entirely withdrawn, and the whole surface of the coral laid bare is covered with slime, which prevents its drying up.

In the Seychelles, of which a short account is given, the giant turtle (*Chelone virgata*) is kept in ponds as at Ascension, and is caught with a rope round the flipper, and dragged out to be slaughtered when convenient. The

author here dug up a Cæcilian (*Cæcilia virgata*), and amused himself with the curious leaf insect (*Phyllium siccifolium*).

The Introduction to the book is followed by a long paper by Prof. Möbius on the Foraminifera of the Mauritius, illustrated by many finely-executed plates. Amongst other Rhizopods a *Haliphysema* occurs, the animal which, by a most extraordinary blunder, was made out by Haeckel to have a multicellular structure, and supposed to represent a Gastræa of modern times. Prof. Möbius confirms the observations of Carter, Savile Kent, and Ray Lankester, to the effect that the animal is in reality simply a Rhizopod. He has examined the structure of the Foraminiferous shells which he describes, very carefully by means of sections. He does not, however, add anything of importance to our knowledge of the structure of the soft tissues of the group.

An account of the Decapod Crustacea by Dr. F. Richter follows that of the Foraminifera. Two crabs of most extraordinary habits are described in this portion of the work. Both belong to the family Polydectinæ. The crabs of this family have their front claws armed with large teeth. Latreille, who first named the crab *Polydectes cupulifer*, remarked that a gummy substance was always to be found at the ends of the claws of this species, and Dana described the animal as having always something spongy in its hands. Dr. Möbius has discovered the remarkable fact that these things held in the two claws of the crab are in reality living sea-anemones. These sea-anemones are attached to the immovable joint of each claw, whilst the teeth of the movable joint of the claw are kept buried deep into the flesh of the sea-anemones, and thus hold them fast, although each anemone can easily be pulled away from its position with the forceps in specimens preserved in spirits. The mouth of the sea-anemony is always turned away from the crab. The same curious combination exists in the case of another species of the same family but of a different genus, *Melia tessellata*, which also inhabits Mauritius. A figure is given of this crab with its pair of Actiniæ, named by Möbius *A. prehensa*, with fully expanded tentacles, held out one in each hand. Möbius gives the following account of the matter. "I collected about fifty male and female specimens of *Melia tessellata*; all of these held in each claw an *Actinia prehensa*. The recurved hooks of the inner margins of the claw joints of the crab are particularly well adapted to hold the Actiniæ fast. I never succeeded in dragging the living Actiniæ out without injuring them. If I left the fragments of them when pulled out lying in the vessel in which the *Melia* was, the crab collected them again into its clutch in a short time. If I cut the Actiniæ in pieces with the scissors, I found them all again in the claws of the crab after a few hours. It is very probable that the Actiniæ aid the crab in catching its prey by means of their thread-cells, and that the Actiniæ, on the other hand, gain by being carried from place to place by the crab, and thus brought into contact with more animals which can serve as food to them, than they would if stationary. This is a very interesting case of commensalism."

The work closes with a long account of the Mollusca of Mauritius and the Seychelles by Prof. E. von Martens.

H. N. MOSELEY

NOTES

THE centenary of the birth of George Stephenson is not to be allowed to pass by in a fruitless way in Newcastle-upon-Tyne. Dinners, speeches, trade-processions, enthusiasm and bunting—all this was to be expected in a place so intimately connected with the birth of railways. But more than this will probably be done, and we are glad to hear that a scheme is on foot for commemorating the 9th of June in a more useful and more lasting manner, viz. by providing a "Stephenson College" for the use

of the houseless but hard-working College of Physical Science of the University of Durham in Newcastle.

THE French Association for the Advancement of Science has been in existence only ten years, but in that short time it has met with astonishing success, and has done some excellent work. To the fifteen sections already existing it proposes to add a sixteenth, under the name of the Section of Pedagogy, and a committee of members will discuss its formation at the forthcoming meeting at Algiers. The subjects of which the Association takes cognisance are divided into four groups, viz., Mathematical Sciences, Physical and Chemical Sciences, Natural Sciences, and Economic Sciences. A goodly list of papers has been already announced, among the authors of which we notice some of the most prominent savans in France. We trust, however, that the Association will not degenerate into a great excursion organisation, as to some extent it appears to have done this year. Thus the meeting lasts for six days, while the return tickets, issued in connection with the Association under very liberal terms, are good for six weeks, and no less than fifteen excursions in the neighbourhood of Algiers have been arranged. Five of these each occupy a week, and one of them a fortnight. The great number of applications for tickets both from France and Spain compel us to imagine that in many cases the membership of the Society has been sought this year rather for the sake of the tempting excursions than for the love of science. April is one of the most lovely months in the year at Algiers: the mean temperature is 16·5° C., with a possible minimum of 8°, and a possible maximum of 30°. In May the mean temperature is 19·5° C., and there may be eight days of rain; while at Biskra the maximum may be as high as 40° C. (104° F.), and not more than one day of rain may be expected in May. A proclamation has been issued by the local committee asking the inhabitants to place rooms at the disposal of the visitors. Among those who will cross the Mediterranean will be Admiral Mouchez, MM. Quatresges, Wurtz, Saporta, the naturalist, M. Cartaillac, the geologist, and many others, who will give interesting papers on a variety of subjects.

MR. ASHTON DILKE tried in vain on Tuesday to get the House of Commons seriously to consider the advisability of adopting the decimal system of coinage in this country. It is hopeless in the present state of public affairs to induce Parliament to attend to a matter of this kind. On the widely beneficial results of the adoption of the metric system in whole or in part we have often insisted. That there would be some inconvenience in making the transition, of course every one will admit; but as compared to the ultimate benefits from the adoption of the metric system, they are not worthy of consideration. Mr. Dilke does well not to let the matter drop out entirely of public notice.

THE Thore prize of the Académie des Sciences of Paris has been awarded to M. A. Vayssiére, préparateur des cours de Zoologie à la Faculté des Sciences de Marseille, for an anatomical memoir of *Prosopistoma punctifrons*, Lat. Some of our readers interested in comparative anatomy may remember having seen the original drawings in London last summer, and will be glad to know that it will soon be forthcoming. M. Vayssiére is a careful expert.

THE French Minister of Public Instruction intends to do a great service to science by publishing monthly a *résumé* of the scientific work being done over France, under the title of *Revue des Sciences*. The review will be under the direction of the venerable M. H. Milne-Edwards, and will consist exclusively of analyses and summaries, but of sufficient detail to give a fair idea of the nature of the work being done. It will embrace the work of individuals and of societies all over the country, and each number will contain about 100 pages.